Impact of Reduced Quantity on Groundwater Quality

Overuse of groundwater resources can result in water quality problems as well. One example of this problem is seen in Southeastern Wisconsin. As prolonged heavy water withdrawals from wells in the deep sandstone aquifer have drawn water levels down hundreds of feet and in recent years, the concentrations of radionuclides and other elements have increased in many of these wells. Radionuclides are carcinogenic and very costly to remove. As a result, several communities facing a regulatory deadline for reducing the level of a specific radionuclide, radium, in their drinking water must look for alternative sources. Alternatives have included switching from a groundwater source to a surface water source, namely Lake Michigan, extensive treatment of water from deep wells to remove the contaminants, and expanded use of wells in shallow aquifers. Each of these options presents significant obstacles or concerns. Continued use of the deep aquifer with extensive treatment will be quite expensive, will continue the existing drawdown problems and may not be sustainable in the long term. Use of Lake Michigan water outside of the Great Lakes Basin would be precedent-setting and requires an applicant to meet rigorous Great Lakes Compact criteria and the concurrence of other Great Lakes states. Currently, the DNR is reviewing the City of Waukesha's application for a diversion of Lake Michigan water. Expanded use of shallow wells may also be problematic because it may impact streams, wetlands, springs, lakes or other shallow wells. In addition, shallow wells are generally more susceptible than deeper wells to contamination from near-surface sources such as nitrate and pesticides.

A second example of regional drawdown causing groundwater quality problems occurs in the Lower Fox River Valley. Here the lower water levels have led to increased detections of arsenic in private well water in recent years (also described in the Groundwater Quality Section of this report). Investigations in the affected area indicate that most of the arsenic is coming from a highly mineralized zone at the top of the St. Peter Sandstone. Increased groundwater use in the Lower Fox River Valley has lowered water levels in the bedrock aquifer. In some locations, this has exposed the mineralized zone to the atmosphere leading to oxidation and subsequent release of arsenic to the groundwater. In 2006 a new (lower) standard of 10 µg/L for arsenic in drinking water took effect, leading to many wells being in violation of this standard.